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DEPARTMENT OF LABOR
DIVISION OF OCCUPATIONAL SAFETY
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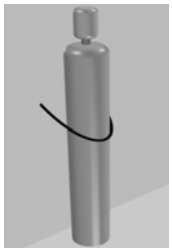
GENERAL GUIDELINES FOR THE SAFE HANDLING AND STORAGE OF COMPRESSED GASES IN CYLINDERS



General Provisions:

-Compressed gases are delivered to work sites in pressurized containers. Pressurized cylinders can be very hazardous if handled improperly. It is extremely important that cylinders do not fall. If they do fall, often the cylinder head malfunctions and releases a tremendous amount of pressurized gas causing the cylinder to spin violently out of control.

-The employer is responsible for **training** all employees on the safe use of compressed gases in the workplace. This includes training employees how to safely attach a regulator to the top of a cylinder.

-Compressed gases should be provided by a reputable vendor. The vendor must provide a **Material Safety Data Sheet (MSDS)** for each gas that is delivered. (The health hazards of the particular gas and the safe work practices for the gas are discussed.) All cylinders of gas must arrive with the name of the gas clearly indicated on the outside of the container. The required DOT markings must be clearly identifiable on the outside of the cylinders also. There is no universal system for color coding the type of gas that is in its cylinder.

Transport of Cylinders:

-All gases that are delivered should be delivered with a **valve protection cap** on the top of each cylinder. This protective cap should not be removed until the cylinder is delivered to its point of use where a regulator is attached. (Some cylinders do not accept caps).

-The gas supplier should be supplying compressed gases with a **pressure relief device** installed and properly maintained as part of the safety system of the cylinder.

-All cylinders of gas should be transported within a facility with a suitable **handcart** designed to transport compressed gases. All cylinders should be secured with the cart's strap or chain when cylinders are transported. **A cylinder of compressed gases should never be transported with a regulator attached to it.** If the cylinder falls and snaps the regulator attachment at the top, it could propel the cylinder with such force that it could break through a wall.

-Most vendors do not supply regulators, carts, wrenches, flash back arrestors or storage brackets as part of the regular gas service. The suppliers typically sell these items.

-The employer is responsible for checking that each cylinder of compressed gas that is delivered to the work place arrives in good condition. Cylinders should be inspected and checked for **defects, bulges, or leaks**. If any of these are present, the cylinders should be taken out of service and the supplier contacted immediately.

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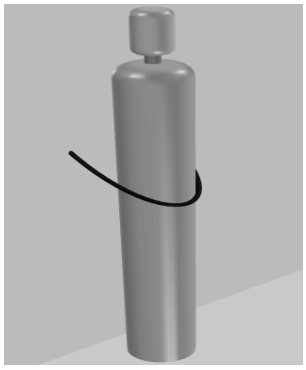
Storage of cylinders:
-Employers must insure that all cylinders of compressed gases are stored in the correct fashion. Quantities of gases should be kept to a minimum on the premises.

-Types of gases should be grouped together such as storing all fuel gases together. Each type of gas must be stored within it own sectioned area and properly secured with a device such as a chain. **A minimum distance of 20 feet must separate all oxygen and fuel (acetylene) gases from each other**.

-Good industry practices usually include having compressed gases delivered and stored in a ground floor (or 1st floor) area of a building. Gases should be secured against a wall, standing upright with a tight chain resting half way (approximately 28 inches off the deck for a standard size cylinder). The area where compressed gases are stored must contain a **"No Smoking**" sign. No employee should smoke in the area where compressed gases are stored and used. A compressed gas storage room should be properly vented.

-Compressed gases cannot be stored in an area where they can be subject to physical damage (i.e. fork lift accident) and should not be stored in an area where they can be subject to corrosion (such as a wet floor in a vehicle service garage). They should not be stored near **flammable materials**. If flammable materials are present (such as gasoline), the cylinders should be separated by a minimum distance of 20 feet from the flammable materials.



-Compressed gases should not be stored near an electrical outlet.

-The name of the gas that is stored in an area must be clearly labeled at the back of the wall. A separate area should be designated for empty cylinders with the word **"empty**" marked at the back of the wall. Each cylinder should be labeled **"empty."** Remember, no cylinder of compressed gas is truly empty. Therefore, empty cylinders of fuel/oxygen systems should be separated from each other by a minimum distance of 20 feet. No employee should smoke around empty cylinders of oxygen.

Using cylinders:
-Only wrenches approved for the opening of compressed gas regulators should be used to open a tank of compressed gas. A hammer should not be used to aid the use of a wrench (i.e. banging open a cylinder by hammering on the wrench). (A regulator that does not open on its own should not be forced open).

-The valve opening should be pointed away from the worker and other people when the tank is opened.

-The vendor is usually an excellent source for matching the **appropriate regulator** to a particular gas. Regulators cannot, and must not, be switched from one gas classification to another. A violent reaction could occur.

-Cylinders should not be lifted by the regulator cap.

-The employer must maintain MSDS's on site for each compressed gas used during each shift. The employer must include compressed gases in the **Hazard Communication Training**.* The employer must have emergency procedures developed for emergencies that involve compressed gas accidents. This includes provisions for accidental leaking of the tanks.

-**The cylinder valve should be closed when the cylinder is not in use.** A regulator with a closed discharge valve is not sufficient. This is a common OSHA violation.

-When cylinders are put into use, the employer has the option of securing the cylinders against a wall with a chain, using a specially designed bracket that mounts to a wall or lab bench, or using a cart such as one that is typically used in welding operations. The cylinders must be securely fastened in any of these options. A strap is sometimes used in these applications.

Specific Gases:

***Fuel (Acetylene)/Oxygen Systems*-Welding Operations-Flash back arrestors** should be used on the cylinders that contain fuel (acetylene)/oxygen systems. All cylinders of fuel gases (including acetylene) must be properly **bonded and grounded** with the use of bonding clips**.**

-**The tanks of fuel/oxygen should only be stored together on a cart if the cart is used regularly.**

-The **hoses** that are used to the connect the system must be in good, serviceable condition. They should not have cracks. They cannot be mended with such items as duct tape. If the hoses are cracked, they must be replaced with new ones.

-**Fire extinguishers** must be present during welding operations involving compressed gases.

Helium-Cylinders of helium for special events or balloon filling in the workplace follows all the same guidelines of this publication.

Other:

-Such devices are coat hangers, ropes, and strings are not acceptable devices to secure cylinders.

-Each industrial size cylinder of gas weighs approximately 175 pounds**. The brass head at the top of the cylinder is the weakest link in the tank.** It can snap off easily causing the cylinder to spin violently. If this happens, the premises should be evacuated immediately.

-Any cylinder that is involved in an **accident,** such as accidental dropping, should be taken out of service immediately. Cylinders that are involved in fires should be taken out of service immediately.

-No cylinder should be used or stored on the premise that is not **clearly marked**.

-All unwanted tanks, empty or partially filled, should be disposed of timely and properly. The supplier should be contacted for assistance.

*Public Sector employees in Massachusetts would included compressed gases in their MA Right-to-Know Training.

References:

29 CFR 1910.101 Compressed Gases
CFR Title 49, Parts 100-199
Compressed Gas Association-Pamphlets P-1-1984, 7th edition
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